WE CLAIM:

1. A channel gain estimation method, comprising:
identifying reliable symbols from a sequence of captured data samples,
estimating a constellation size from a set of maximally-sized reliable symbols.

2. The channel gain estimation method of claim 1, further comprising estimating constellation points $\hat{P}^q$ within a square constellation with uniformly separated points according to:

$$\hat{P}_1^q = \mathrm{sign}(q) \cdot \frac{\hat{P}_1^{max}}{\sqrt{M}-1} \cdot (2|q|-1) \text{, where}$$

$\hat{P}^{max}$ represents the estimated constellation size,
M represents an order of the constellation, and
q is an index provided along an axis of the constellation.

3. The channel gain estimation method of claim 1, further comprising estimating constellation points $\hat{P}_{1_J}^q$ within a general constellation according to:

$$\hat{P}_{1_J}^q = \mathrm{sign}(q_J) \cdot \frac{\hat{P}_{1_J}^{max}}{M_J - 1} \cdot (2|q_J|-1) \text{, where}$$

$\hat{P}_{1_J}^{max}$ represents the estimated constellation size along a J^{th} axis,

M_J represents an order of the constellation along the J^{th} axis, and
q_J is an index provided along along the J^{th} axis of the constellation.

4. The channel gain estimation method of claim 1, further comprising revising the estimate of the constellation size based on additional reliable symbols.

5. The channel gain estimation method of claim 4, wherein the revising comprises estimating a second set of constellation points $\hat{P}_2^q$ according to:

$$\hat{P}_2^q = \hat{P}_1^q + (2|q|-1) \cdot \hat{e}_1 \text{, where}$$

$$\hat{e}_1 = \frac{1}{s}\sum_q \frac{1}{2|q|-1}\cdot \sum_{n\in s_q}\left(\hat{P}_1^q - y_n^q\right),$$

$$\hat{P}_1^q = \mathrm{sign}(q)\cdot\frac{\hat{P}_1^{max}}{\sqrt{M}-1}\cdot(2|q|-1),$$

$\hat{P}^{max}$ represents the estimated value of the magnitude of the maximum constellation point,

M represents an order of the constellation,

s is a number of detected reliable symbols,

s_q is a set of reliable symbols that are associated with the constellation point q,

$\{y_n^q\}$ are the set of sample values which are reliable symbols that are associated with the q^{th} estimated constellation point.. and

q is an index provided along an axis of the constellation.

6. A reliable symbol identification method comprising:

calculating a reliability factor of a candidate sample from constellation points nearest to each of a plurality of samples in proximity to the candidate sample,

if the reliability factor is less than a predetermined limit, designating the candidate sample as a reliable symbol.

7. The method of claim 6, wherein the reliability factor R_n of the candidate sample is given by:

$$R_n = \sum_{\substack{i=-K_1\\ i\neq 0}}^{K_2} |p_{n-i}|\cdot c_i \text{ , where}$$

p_{n-i} is the value of a constellation point nearest to the sample y_{n-i} which is in proximity to the candidate sample y_n,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

8. The method of claim 6, wherein the reliability of a two-dimensional candidate sample y_n is given by:

$$R_n = \sum_{\substack{i=-K_1 \\ i\neq 0}}^{K_2} \sqrt{p_{1_{n-i}}^2 + p_{2_{n-i}}^2} \cdot c_i \text{, where}$$

$p_{1_{n-i}}$ and $p_{2_{n-i}}$ respectively represent first and second dimensional values of a constellation point nearest to y_{n-i} which is in proximity to the candidate sample y_n,

K_1, K_2 are numbers of samples adjacent to the candidate sample, and

c_i is a coefficient.

9. The method of claim 6, further comprising, for any samples having similar reliability factors, prioritizing the samples based on the samples' values.

10. The method of claim 6, further comprising, for any sample having a reliability factor that is less than the predetermined limit, comparing the sample's value against a second threshold and, if the value exceeds the threshold, disqualifying the sample as a reliable symbol.

11. The method of claim 6 further comprising, for any samples having similar reliability factors, prioritizing the samples based on values of constellation points nearest to the samples.

12. The method of claim 6 further comprising, for any sample having a reliability factor that is less than the predetermined limit, comparing a value of a constellation point nearest to the sample to a second threshold and, if the value exceeds the threshold, disqualifying the sample as a reliable symbol.

13. A method of identifying reliable symbols, comprising, for a candidate sample y_n: iteratively, for $i= -K_1$ to K_2, $i\neq 0$:

adding to a reliability factor a value derived from a constellation point nearest to a sample y_{n-i},

if the reliability factor exceeds a predetermined limit, disqualifying the candidate sample as a reliable symbol, and

otherwise, incrementing i and, if i=0, re-incrementing i for a subsequent iteration;

thereafter, unless the candidate symbol has been disqualified, designating the candidate sample as a reliable symbol.

14. The method of claim 13, wherein the adding adds a scaled value of the constellation point to the reliability factor, the value scaled in accordance with a predetermined coefficient c_l.

15. The method of claim 13, the predetermined limit is $(K_1 + K_2)d_{min}$ where d_{min} is half a distance between two constellation points that are closest together in a governing constellation.

16. The method of claim 13, wherein the predetermined limit is the product of $K_1 + K_2$ and half the width of an annular constellation ring associated with the candidate symbol.

17. A method of identifying reliable symbols, comprising, for a candidate sample,

determining whether any of a plurality of constellation points each associated with sample neighboring the candidate sample is within a predetermined threshold,

if none of the constellation points exceed the threshold, designating the candidate sample as a reliable symbol.

18. The method of claim 17, wherein the neighboring samples occur in a first window adjacent to the candidate sample on one side of the candidate sample.

19. The method of claim 17, wherein the neighboring samples occur in a pair of windows that are adjacent to, and on either side of the candidate sample.